

LIS009638329B2

(12) United States Patent

Yarimizu et al.

(54) ENGINE REAR SEAL

(75) Inventors: **Kenichi Yarimizu**, Fukushima (JP);

Tomoaki Nishimura, Fukushima (JP)

(73) Assignee: **NOK Corporation** (JP)

(*) Notice: Subject to any disclaimer, the term of this

patent is extended or adjusted under 35

U.S.C. 154(b) by 0 days.

(21) Appl. No.: 14/366,872

(22) PCT Filed: Aug. 27, 2012

(86) PCT No.: PCT/JP2012/071539

§ 371 (c)(1),

(2), (4) Date: Jun. 19, 2014

(87) PCT Pub. No.: WO2013/094251

PCT Pub. Date: Jun. 27, 2013

(65) Prior Publication Data

US 2014/0339775 A1 Nov. 20, 2014

(30) Foreign Application Priority Data

Dec. 21, 2011 (JP) 2011-279433

(51) Int. Cl.

F16J 15/3244 (2016.01) **F16J 15/3204** (2016.01)

(Continued)

(52) U.S. Cl.

CPC *F16J 15/3204* (2013.01); *F02F 7/00* (2013.01); *F02F 11/00* (2013.01); *F02F*

11/007 (2013.01);

(Continued)

(58) **Field of Classification Search** CPC F16J 15/42; F16C 33/7863

(Continued)

(45) **Date of Patent:**

(10) Patent No.:

(56) References Cited

2,871,039 A * 1/1959 Payne F16J 15/36 277/371 3,606,351 A * 9/1971 Hallerback F16C 33/78

US 9,638,329 B2

May 2, 2017

277/353

(Continued)

U.S. PATENT DOCUMENTS

FOREIGN PATENT DOCUMENTS

CN 2521446 Y 11/2002 CN 1484737 A 3/2004 (Continued)

OTHER PUBLICATIONS

Extended European Search Report for Patent Application No. EP12859542.8 dated Jun. 23, 2015 (3 pages).

Primary Examiner — Kristina Fulton
Assistant Examiner — L. Susmitha Koneru
(74) Attorney, Agent, or Firm — Harness, Dickey & Pierce, P.L.C.

(57) ABSTRACT

In an engine rear seal installed to an engine rear portion having an end plate arranged in a motor exterior side of a housing, and a flywheel arranged in a motor exterior side of the end plate, the engine rear seal has an oil seal and a muddy water preventing seal. The muddy water preventing seal integrally has an attaching portion, and a seal lip directed to a diametrically outer side from the attaching portion and slidably coming into close contact with an end surface in the motor exterior side of the end plate. The seal lip has an inclined lip end back surface portion, and is structured such that a lip end comes into contact with the end surface at the low-speed rotating time and the lip end moves away from the end plate on the basis of an action of a centrifugal force at the high-speed rotating time.

7 Claims, 5 Drawing Sheets

